

What is claimed is:

- 1 1. A storage apparatus comprising:
2 a gateway, having a processor, a memory, and at least one port operative to
3 connect to an external network;
4 at least one of a plurality of devices that store information, each of said
5 devices further comprising at least one of a plurality of volumes;
6 a server;
7 a switch; and
8 an internal network connecting said gateway, said server, said switch, and
9 said at least one of a plurality of devices that store information; wherein
10 said gateway receives a data packet for storing, and thereupon searches in
11 said memory for a virtual destination address retrieved from said data packet, and
12 thereupon reads from said memory a corresponding destination address for a particular
13 one of said at least one of a plurality of devices that store information, and thereupon
14 replaces in said data packet said virtual destination address with said corresponding
15 destination address from said memory.
- 1 2. The apparatus of claim 1, wherein said gateway authenticates a
2 source of said data packet based upon a user address in said data packet.
- 1 3. The apparatus of claim 1, wherein said external network comprises
2 a virtual private network (VPN), and wherein said gateway performs VPN processing for
3 said data packet.
- 1 4. The apparatus of claim 1, wherein said external network uses a first
2 protocol and said internal network uses a second protocol, and wherein said gateway
3 translates said data packet from said first protocol to said second protocol.
- 1 5. The apparatus of claim 4, wherein said first protocol comprises at
2 least one of IP protocol, ATM, and Fibre channel.
- 1 6. The apparatus of claim 4, wherein said second protocol comprises
2 at least one of IP protocol, ATM, and Fibre channel.

1 7. The apparatus of claim 1, wherein said gateway searches in said
2 data packet for a command and a virtual private volume identifier, and if found,
3 thereupon searches in said memory for a volume identifier corresponding to said virtual
4 private volume identifier, and thereupon replaces said virtual private volume identifier in
5 said data packet with said volume identifier.

1 8. The apparatus of claim 1, wherein said gateway receives a data
2 packet being sent to said external network, and thereupon searches in said memory for a
3 destination address retrieved from said data packet, and thereupon reads from said
4 memory a corresponding virtual destination address from said memory, and thereupon
5 replaces in said data packet said destination address with said corresponding virtual
6 destination address from said memory.

1 9. The apparatus of claim 1, wherein said virtual destination address
2 and said destination address are stored in a table.

1 10. A storage apparatus comprising:
2 a server, having a processor, a memory, and at least one port operative to
3 connect to an external network;
4 at least one of a plurality of devices that store information, each of said
5 devices further comprising at least one of a plurality of volumes;
6 a switch; and
7 an internal network connecting said server, said switch, and said at least
8 one of a plurality of devices that store information; wherein
9 said server receives a data packet for storing, and thereupon searches in
10 said memory for a virtual destination address retrieved from said data packet, and
11 thereupon reads from said memory a corresponding destination address for a particular
12 one of said at least one of a plurality of devices that store information, and thereupon
13 replaces in said data packet said virtual destination address with said corresponding
14 destination address from said memory.

1 11. The apparatus of claim 10, further comprising a gateway, said
2 gateway having a processor, a memory, and at least one port operative to connect to an
3 external network, and wherein said external network uses a first protocol and said internal

4 network uses a second protocol, and wherein said gateway translates said data packet
5 from said first protocol to said second protocol.

1 12. The apparatus of claim 11, wherein said first protocol comprises at
2 least one of IP protocol, ATM, and Fibre channel.

1 13. The apparatus of claim 11, wherein said second protocol comprises
2 at least one of IP protocol, ATM, and Fibre channel.

1 14. The apparatus of claim 11, wherein said external network
2 comprises a virtual private network (VPN), and wherein said gateway performs VPN
3 processing for said data packet.

1 15. The apparatus of claim 10, wherein said server searches in said
2 data packet for a command and a virtual private volume identifier, and if found,
3 thereupon searches in said memory for a volume identifier corresponding to said virtual
4 private volume identifier, and thereupon replaces said virtual private volume identifier in
5 said data packet with said volume identifier.

1 16. The apparatus of claim 10, wherein said server receives a data
2 packet being sent to said external network, and thereupon searches in said memory for a
3 destination address retrieved from said data packet, and thereupon reads from said
4 memory a corresponding virtual destination address from said memory, and thereupon
5 replaces in said data packet said destination address with said corresponding virtual
6 destination address from said memory.

1 17. The apparatus of claim 10, wherein said server authenticates a
2 source of said data packet based upon a user address in said data packet.

1 18. A storage apparatus comprising:
2 a switch, having a processor, a memory, and at least one port operative to
3 connect to an external network;
4 at least one of a plurality of devices that store information, each of said
5 devices further comprising at least one of a plurality of volumes;
6 a server; and

7 an internal network connecting said server, said switch, and said at least
8 one of a plurality of devices that store information; wherein
9 said switch receives a data packet for storing, and thereupon searches in
10 said memory for a virtual destination address retrieved from said data packet, and
11 thereupon reads from said memory a corresponding destination address for a particular
12 one of said at least one of a plurality of devices that store information, and thereupon
13 replaces in said data packet said virtual destination address with said corresponding
14 destination address from said memory.

1 19. The apparatus of claim 18, further comprising a gateway, said
2 gateway having a processor, a memory, and at least one port operative to connect to an
3 external network, and wherein said external network uses a first protocol and said internal
4 network uses a second protocol, and wherein said gateway translates said data packet
5 from said first protocol to said second protocol.

1 20. The apparatus of claim 19, wherein said first protocol comprises at
2 least one of IP protocol, ATM, and Fibre channel.

1 21. The apparatus of claim 19, wherein said second protocol comprises
2 at least one of IP protocol, ATM, and Fibre channel.

1 22. The apparatus of claim 19, wherein said external network
2 comprises a virtual private network (VPN), and wherein said gateway performs VPN
3 processing for said data packet.

1 23. The apparatus of claim 18, wherein said switch searches in said
2 data packet for a command and a virtual private volume identifier, and if found,
3 thereupon searches in said memory for a volume identifier corresponding to said virtual
4 private volume identifier, and thereupon replaces said virtual private volume identifier in
5 said data packet with said volume identifier.

1 24. The apparatus of claim 18, wherein said switch receives a data
2 packet being sent to said external network, and thereupon searches in said memory for a
3 destination address retrieved from said data packet, and thereupon reads from said
4 memory a corresponding virtual destination address from said memory, and thereupon

5 replaces in said data packet said destination address with said corresponding virtual
6 destination address from said memory.

1 25. The apparatus of claim 18, wherein said switch authenticates a
2 source of said data packet based upon a user address in said data packet.

1 26. A storage apparatus comprising:
2 at least one of a plurality of devices that store information, each of said
3 devices further comprising at least one of a plurality of volumes, a processor, a memory,
4 and at least one port operative to connect to an external network;
5 a switch;
6 a server; and
7 an internal network connecting said server, said switch, and said at least
8 one of a plurality of devices that store information; wherein
9 said at least one of a plurality of devices that store information receives a
10 data packet for storing, and thereupon searches in said memory for a virtual destination
11 address retrieved from said data packet, and thereupon reads from said memory a
12 corresponding destination address for a particular one of said at least one of a plurality of
13 devices that store information, and thereupon replaces in said data packet said virtual
14 destination address with said corresponding destination address from said memory.

1 27. The apparatus of claim 26, further comprising a gateway, said
2 gateway having a processor, a memory, and at least one port operative to connect to an
3 external network, and wherein said external network uses a first protocol and said internal
4 network uses a second protocol, and wherein said gateway translates said data packet
5 from said first protocol to said second protocol.

1 28. The apparatus of claim 27, wherein said first protocol comprises at
2 least one of IP protocol, ATM, and Fibre channel.

1 29. The apparatus of claim 27, wherein said second protocol comprises
2 at least one of IP protocol, ATM, and Fibre channel.

1 30. The apparatus of claim 27, wherein said external network
2 comprises a virtual private network (VPN), and wherein said gateway performs VPN
3 processing for said data packet.

1 31. The apparatus of claim 26, wherein said at least one of a plurality
2 of devices that store information searches in said data packet for a command and a virtual
3 private volume identifier, and if found, thereupon searches in said memory for a volume
4 identifier corresponding to said virtual private volume identifier, and thereupon replaces
5 said virtual private volume identifier in said data packet with said volume identifier.

1 32. The apparatus of claim 26, wherein said at least one of a plurality
2 of devices that store information receives a data packet being sent to said external
3 network, and thereupon searches in said memory for a destination address retrieved from
4 said data packet, and thereupon reads from said memory a corresponding virtual
5 destination address from said memory, and thereupon replaces in said data packet said
6 destination address with said corresponding virtual destination address from said
7 memory.

1 33. The apparatus of claim 26, wherein said at least one of a plurality
2 of devices that store information authenticates a source of said data packet based upon a
3 user address in said data packet.

1 34. A method for managing storage, comprising:
2 receiving a data packet;
3 searching for a virtual destination address retrieved from said data packet;
4 reading a corresponding destination address for a particular one of at least
5 one of a plurality of devices that store information; and
6 replacing in said data packet said virtual destination address with said
7 corresponding destination address.

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